# EXECUTIVE SUMMARY

ES.1 The Camp Bonneville Military Reservation (Camp Bonneville) was used by the Department of Defense from 1910 to 1995 for troop training. Training exercises conducted at Camp Bonneville included weapons training using small arms, assault weapons, and field and air defense artillery. Camp Bonneville consists of approximately 3,840 acres and is located wholly in Clark County, Washington. The U.S. Congress approved the closure of Camp Bonneville under the 1995 Base Realignment and Closure (BRAC) Commission.

ES.2 Camp Bonneville is proposed for transfer to Clark County. This property transfer will provide significant recreational, educational, and environmental opportunities for the local community and will be managed as a regional park by Clark County. The regional park includes designated areas for classrooms, amphitheater, RV and tent camping, and environmental study areas. The remainder of Camp Bonneville is designated as a wildlife management area and will be utilized for wildlife habitat, forestry, hiking and equestrian trails.

ES.3 Consistent with BRAC policy, cleanup at Camp Bonneville is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). Parsons Infrastructure & Technology Group (Parsons) prepared this Remedial Investigation / Feasibility Study (RI/FS) Report consistent with CERCLA and the Washington State Model Toxics Control Act (MTCA). This Remedial Action Unit (RAU) 3 RI/FS Report deals exclusively with explosives safety of munitions and explosives of concern (MEC) resulting from prior actions at Camp Bonneville (potential impacts to soil and groundwater associated with constituent migration from munitions is not addressed herein).

ES.4 The Camp Bonneville RAU 3 site characterization has been conducted in multiple phases of work, with each subsequent phase building upon the findings and conclusions of the prior investigations. The site characterization efforts have included the following:

- United States Army Corps of Engineers (USACE)-St. Louis conducted a historical records search and prepared an Archives Search Report in 1997 which details findings on Camp Bonneville.

- United States Army Engineering and Support Center - Huntsville (USAESCH) conducted a statistical MEC sampling site characterization effort at Camp Bonneville in 1998.

- USACE Topographic Engineering Center performed a historical aerial photo-analysis of Camp Bonneville in 2000 to identify areas of potential concern.

- USAESCH conducted an instrument-aided field reconnaissance to evaluate and document MEC-related characteristics of areas of concern and areas of potential concern (AOCs/AOPCs) in 2001.

- A comprehensive Conceptual Site Model (CSM) for MEC activities was collaboratively developed by representatives of Washington State Department of Ecology, Clark County, U.S. Environmental Protection Agency and the U.S. Army in 2002.

- USAESCH conducted a second round of instrument-aided reconnaissance in 2002 to evaluate MEC-related characteristics in the proposed future regional park lands, including the roads and trails, and to confirm or refute the CSM.

ES.5 Camp Bonneville has been thoroughly characterized for the presence, location, and density of munitoins that are artifacts of past troop training activities. A total of 207 MEC sampling grids, totaling approximately 40 acres, were geophysically mapped and intrusively sampled. A total of 16,004 discrete reconnaissance data waypoints have been collected, analyzed, and mapped using digital technology and geographic information system (GIS) geo-spatial analysis. Over 2,400 acres of the 3,840 acre site has been characterized for the presence of potential MEC-related activities. The 2,400 acres of site characterization includes all of the known and suspected MEC source sites; all of the proposed future regional park re-use sites; all of the existing trails and roads; and the entire 1,200 acre area of the proposed future regional park. The Camp Bonneville RAU 3 site characterization also included the performance of two interim removal actions. These two time-critical removal actions (TCRAs) were conducted to address risks associated with the discovery of unexploded ordnance (UXO) at the M203 Ranges and Demolition Area 1 sites.

ES.6 A qualitative risk assessment to evaluate MEC hazards was performed to aid in evaluating cleanup alternatives and to establish acceptable remediation levels for use during the feasibility study. The MEC risk assessment approach developed for Camp Bonneville is a two-step process. The initial evaluation addresses the munition source characteristics and the type of explosive safety hazards that are likely to be encountered. The second evaluation addresses the likelihood for interaction between the MEC source and the human receptor and is based on the future land reuse and accessibility of an area. The Target Areas, Firing Points and open burn / open demolition (OB/OD) Areas were determined to pose the greatest explosive safety exposure hazard; while the remaining site types pose a negligible explosive safety exposure hazard.

ES.7 In addition, each of the planned reuse areas listed below was selected for risk analysis to evaluate if these sites require a specific risk management strategy:

- Roads and Trails;

- High Intensity Reuse Areas;

- High – Accessible Medium Intensity Reuse Areas;
- Remaining Medium Intensity Reuse Areas; and
- Wildlife Management Area.

ES.8 None of the planned reuse areas were determined to pose an appreciable explosive exposure hazard based on an evaluation of the MEC source and receptor interaction.

ES.9 MTCA does not identify a cleanup level for MEC; nor does it identify exposure factors for MEC that could be used to develop a site-specific cleanup level. The MTCA methods that were developed for chemical contaminants are not applicable for establishing cleanup levels for MEC. Consistent with MTCA Washington Administrative Code (WAC 173-340) remediation levels and points of compliance were identified to ensure protection of the public consistent with the planned land use. The remediation level is based on the site characterization data and the MEC risk assessment. The proposed remediation level for Camp Bonneville is the condition where the likelihood for MEC source and receptor interaction is negligible. The points of compliance will be based on those areas (measured in both horizontal and vertical dimensions) where the MEC source and receptor interactions are likely to occur.

ES.10 A Feasibility Study (FS) was conducted consistent with CERCLA and MTCA (WAC 173-340-350) requirements. The following six cleanup action alternatives were evaluated for each of the MEC source types and proposed reuse areas:

- No Further Action (NFA);
- Institutional Controls (ICs);
- Surface Clearance with ICs;
- Clearance to Frost Depth (14 inches) with ICs;
- Subsurface Clearance (to a depth based on projected end use) with ICs; and
- Excavation and Restoration (E&R).

ES.11 A disproportionate cost analysis was performed, consistent with MTCA, to evaluate whether the cleanup action uses permanent solutions to the maximum extent practicable. Although the E&R cleanup alternative is a permanent remedy, implementation of this cleanup action alternative at Camp Bonneville results in near-total ecological destruction, and as such, does not meet the MTCA minimum threshold requirements. The disproportionate cost analysis compared the costs and benefits of the cleanup action alternatives.

ES.12 The cleanup actions recommended for Camp Bonneville based on the FS include the following:

- Target Areas - Frost Depth Clearance (14-inches);
- Firing Points – Frost Depth Clearance (14-inches) ;
- OB/OD Areas - Subsurface Clearance (4 feet) in Demolition Areas and surface clearance in buffer;
- High Intensity Reuse Areas – Subsurface Clearance (4 feet) and Frost Depth Clearance (14-inches) depending on the proposed future reuse (intrusive or non-intrusive, respectively); and,
- High – Accessible Medium Intensity Reuse Areas – Frost Depth Clearance (14-inches).

ES.13 In addition to the clearance actions, site-specific ICs consisting of signage and/or fencing are recommended; as well as site-wide ICs consisting of land use controls and educational awareness program (brochures, fact sheets, outreach to schools, audio/visual presentations, etc). Additional site-wide IC components also include the establishment of an exhibit and display depicting the Camp Bonneville site history and munitions used at the site. The purpose of land use controls is to ensure that the Camp Bonneville regional park remains as a park, and the wildlife management area continues to be used only for wildlife management and forestry. The estimated cost to implement site-wide ICs is $250,000. The total estimated cost for implementation of the recommended cleanup action alternatives, including site-wide ICs is $16,774,000. Table ES.1 presents a summary of the sites, cleanup actions and associated costs.

## TABLE ES.1
## SUMMARY OF RECOMMENDED CLEANUP ACTIONS AND COSTS

| Site Name | Recommended Cleanup Action | Cost |
|---|---|---|
| Target Areas | Frost Depth Clearance (14-inches) with Site-Specific ICs | $273,000 |
| Central Impact Target Area | Site-Specific ICs | $124,000 |
| Open Burn/Open Demolition Areas | Subsurface Clearance (4 feet) at Demolition Areas 2 and 3 in a 300-feet x 300-feet Grid and Site-Specific ICs;<br>Clearance to Frost Depth near the Demolition Areas 1, 2, and 3 in a 500-feet x 500-feet Grid Buffer Area; | $150,000<br>$1,120,000 |
| Firing Points | Frost Depth Clearance (14-inches) with Site-Specific ICs | $421,000 |
| Training Areas (M203 Practice Range/ Mortar Practice Range) | Site-Specific ICs | $6,000 |
| Range Safety Fans | Site-Wide ICs | N/A |
| Storage Magazines/Transfer Points (Building 2950) | Site-Specific ICs | $3,000 |
| Maneuver Areas | Site-Wide ICs | N/A |
| Central Impact Area (Not Including Targets) | Site-Specific ICs | $573,000 |
| Roads and Trails | Frost Depth Clearance (14-inches) and Site-Specific ICs | $2,142,000 |
| High Intensity Reuse Areas | Subsurface Clearance (4 feet) for Reuse Areas with Future Intrusive Activities;<br>Frost Depth Clearance (14-inches) for the Reuse Areas with No Future Intrusive Activities; and Site-specific ICs | $2,264,000<br>$4,805,000 |
| High Accessible – Medium Intensity Reuse Areas | Frost Depth Clearance (14-inches) with Site-Specific ICs | $4,643,000 |
| Remaining Medium Reuse Intensity Areas | Site-Wide ICs | N/A |
| Wildlife Management Area | Site-Wide ICs | N/A |
| Site-Wide | Site-Wide ICs | $250,000 |